

CLAIMS

WHAT IS CLAIMED IS:

1. A composite tubular liner suitable for the trenchless rehabilitation of existing conduits, comprising:

5 a layer of a resin absorbent material joined at its edges to form a tube;

a layer of a plurality of bundles of high modulus fibers disposed circumferentially on the outer surfaces of the resin absorbent material;

at least one layer of resin absorbent material joined at their edges to form a tube about the high modulus fibers:

10 a layer of a plurality of bundles of high modulus fibers disposed circumferentially on the outer surfaces of the resin absorbent material

an impermeable layer disposed about the outer layer of high modulus fibers; and

15 the bundles of high modulus fibers aligned circumferentially on both sides of the resin absorbent layer with the ends of the bundles overlapping so that upon installation and expansion of the tubular composite, the ends of the high modulus fibers slide past each other to allow for expansion to the wall of the existing conduit before the resin is cured.

20 2. The composite tubular liner of claim 1, wherein the resin absorbent material is a needled felt.

3. The composite tubular liner of claim 2, wherein the needled felt is polyester.

4. The composite tubular liner of claim 1, wherein the resin absorbent material is joined by one of a butt seam, flame bonding and adhesive.

5. The composite liner of claim 1, wherein the inner layer of high modulus fibers are disposed on and secured to a porous substrate facing the inner tube of resin absorbent material.

6. The composite liner of claim 5, wherein the porous substrate is a polyester netting.

7. The composite liner of claim 5, wherein the porous substrate is a resin absorbent material.

8. The composite liner of claim 5, wherein the high modulus fibers on the inner surface of the resin absorbent material are joined to the substrate by longitudinal stitching substantially perpendicular to the bundles of fibers.

9. The composite liner of claim 1, wherein the outer layer of high modulus fibers are disposed on and secured to the outside of a porous substrate.

10. The composite liner of claim 9, wherein the high modulus fibers are joined to the porous substrate by longitudinal stitching substantially perpendicular to the bundles of fibers.

11. The composite tubular liner of claim 1, wherein the high modulus fiber is selected from the group consisting of glass, polyester, polypropylene, nylon, carbon, Aramid (aromatic polyamide), steel and mixtures thereof.

12. The composite tubular liner of claim 1, wherein the high modulus fiber is carbon fiber.

13. The composite tubular liner of claim 13, wherein the carbon fibers are disposed in tows containing between about 30,000 to 100,000 individual fibers of between about 200 to 750 feet per pound.

14. The composite tubular liner of claim 1, wherein the high modulus fiber is glass fiber.

15. The composite tubular liner of claim 14, wherein the glass is a type E glass in bundles with strands having a continuous length of about 100 to 1,000 feet per pound.

16. The composite tubular liner of claim 1, wherein the at least one outer layer of high modulus fibers are stitched together substantially perpendicular to the substantially parallel bundles of fibers.

17. The composite tubular liner of claim 1, wherein the high modulus fibers in at least one of the layers of high modulus fibers are joined at the edges of the fibers overlapped to allow for expansion before the resin is cured.

18. The composite tubular liner of claim 1, wherein the high modulus fibers are disposed circumferentially around the resin absorbent layer with the ends of the bundles overlapping to allow for expansion before cure and provide for overlap of the bundles.

19. The composite tubular liner of claim 1, wherein the impermeable layer disposed on the outer layer of high modulus fibers includes resin absorbent material on the inner surface forming a bond with resin in the resin absorbent layer after cure.

20. The composite tubular liner of claim 1, wherein at least one of the layers of reinforcing fibers includes a high tensile strength fiber in the axial direction.